

### **REMARKS/ARGUMENTS**

In the Office action mailed on November 10, 2003, the examiner allowed claims 1-12, 31-70, 76-87 and 96-107. Examiner rejected claims 13, 15-16, 71-74, and 93 of this application under 35 U.S.C. § 103(a) as unpatentable over JP 411204859 ('859). Claims 88-89 were rejected under 35 U.S.C. § 102(b) as anticipated by Snitzer (USPN 5,251,062). Claims 14, 17-30, 75, 90-92, 94 and 95 were objected as being dependent upon rejected base claims. The Examiner's comments have been carefully noted.

Applicants appreciate the time and consideration provided by Examiner in reviewing this application, however, respectfully traverse the rejection of the claims at least for the following reasons.

#### **Rejection under 35 U.S.C. §102**

Claims 88 and 89 are rejected as anticipated by Snitzer's USPN 5,251,062 ('062). Anticipation under 35 U.S.C. §102 requires that each and every claimed feature be disclosed by a single prior art reference.

Applicants traverse the rejection of claims 88-89 at least for the following reasons.

The '062 reference teaches a tellurite glass for doping with rare-earth metals and a fiber amplifier using it. However, the '062 reference fails to teach a Raman amplifier and a use of the tellurite glass therein. The rare-earth doped glass fiber amplifier is completely different in mechanism from the Raman fiber amplifier. The former is based on stimulated emission from excited states of the rare-earth metal ion, whereas the latter is based on stimulated Raman scattering by the glass fiber itself.

In the invention of claim 88, the erbium-doped tellurite fiber acts not only as an amplification medium by erbium ions but also as a gain medium for stimulated Raman amplification (see the fifteenth embodiment: page 57, lines 5-8). This feature is caused by pumping with 1410-1440 nm light instead of 1460 nm light taught by the '062 reference (Col. 1, line 40), and thereby the bottom between two peaks of the gain spectrum of Raman amplification is compensated by the peak of erbium ion amplification to obtain a broad flat gain band. This feature and advantage are not taught in the '062 reference. Claim 88 is amended to clarify that the claimed optical fiber amplifier is an optical *Raman* fiber amplifier.

Further, the concentration of the doped erbium ion is important for achieving the above advantage, since gain coefficients of erbium ion amplification should be comparable to or smaller than that of Raman amplification. In fact, the concentration "1000ppm" of the erbium ion of claim 89 is at least ten-fold smaller than the concentration described in the '062 reference (Col. 6, lines 42-44). Also, there is no motivation to reduce the doping amount of erbium in the '062 reference, since the '062 reference, to the contrarily, teaches that a large amount of optically excitable rare-earth metal ion can be incorporated (Col. 6, line 31). Moreover, it is well known that a higher concentration of erbium ion is desirable in amplification when using a fiber of short length. For the above reason, claims 88 and 89 as amended by this amendment are patentable over '062 reference.

#### **Rejection under 35 U. S. C. §103(a)**

According to MPEP §706.02(j):

"To establish a *prima facie* case of obviousness... the prior art reference (or references when combined) must teach or suggest all claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on the applicant's disclosure."

The following claims have been rejected based on teachings of JP 411204859 ('859).

Applicants respectfully traverse the Examiner's opinion that claims 13, 15-16, 71-74 and 93 are unpatentable over JP 411204859-A.

The '859 reference only teaches a glass fiber amplifier in which a plurality of fibers for amplification including rare-earth ion are connected in series. The '859 reference fails to teach a Raman amplifier which is quite different in mechanism from the rare-earth doped fiber amplifier.

The optical fiber amplifier claimed in the above-captioned claims comprise a tellurite-glass Raman fiber amplifier as an indispensable component. That is, both of the tellurite fiber and the silica fiber in Claims 13 and 15-16 are amplification media for Raman amplification in which rare-earth ions are not doped. This is also true for the tellurite fiber (the second component) in claims 71-74 and the tellurite fiber in the component (a) in claim 93.

Claims 13, 71, 88 and 93 are amended to recite a Raman amplifier and an optical communication system using Raman amplification.

Therefore, the optical fiber amplifiers of the amended claims 13, 71, 88, and the optical communication system of the amended claim 93 are patentable over '859 reference.

In light of these remarks, it is respectfully submitted the claims 13, 15-17, 71-74 and 93 comply with 35 U.S.C. §103, and allowable in view of prior art.

**Claims 14, 18-30, 75, 90-92, 94 and 95:**

The above objected claims should be allowed as dependent upon allowable base claims.

In view of the above, it is respectfully submitted that the application is in condition for allowance which allowance is earnestly solicited.

The Commissioner is hereby authorized to charge any additional fees which may be required in this application under 37 C.F.R. §§1.16-1.17 during its entire pendency, or credit any overpayment, to Deposit Account No. 06-1135. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1135.

Respectfully submitted,

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